

NEW SPECIES OF PARMELIA (LICHENS) FROM TROPICAL AMERICA 1.

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Parmelia boquetensis Hale, sp. nov.

Thallus corticola, adnatus ad ramos, 8-12 cm latus, cinereo-albidus, lobis subirregularibus, margine lobulascentibus, 3-4 mm latis, isidiis sorediisque destitutis; cortex superior 13-16 μ crassus, stratum gonidiale 16-18 μ crassum, medulla alba, 100 μ crassa, cortex inferior 14 μ crassus; subtus niger, sparse vel modice rhizinosus, rhizinis sparse dichotome ramosis. Apothecia numerosa, adnata, 2-3 mm diametro, disco imperforato, hymenio 45-50 μ alto, sporis 8, simplicibus, 6 X 12 μ (Fig. 1).

Chemistry: Atranorin and salazinic acid.

Holotype: Panama. Scrub trees in dry pasture near Boquete, Chiriquí, elev. about 1500 m, M.E. Hale 38878, 1 April 1973 (US).

Additional specimens examined. Panama. 3 km south of Volcan, Chiriquí, Hale 38811, 38831, 38902 (US); Boquete, Chiriquí, Hale 38848 (US).

This species at first glance resembles P. sublaevigata (Nyl.) Nyl., which contains norstictic acid in addition to salazinic acid and has crowded shorter lobes and often a dull pruinose surface. This and all following species belong to subgenus Parmelia section Hypotrachyna.

Parmelia contradicta Hale, sp. nov.

Thallus saxicola, laxe adnatus, coriaceus, cinereo-albus, 6-8 cm latus, lobis linearibus, 1-2 mm latis, dichotome ramosis, isidiis sorediisque destitutis; superne planus, nitidus; cortex superior 18-20 μ crassus, stratum gonidiale 22-28 μ crassum, medulla alba, 130-150 μ crassa, cortex inferior 14-18 μ crassus; subtus niger, sparse rhizinosus, rhizinis sparse dichotome ramosis. Apothecia numerosa, adnata, 2-4 diametro, disco imperforato, hymenio 40-45 μ

alto, sporis 8, simplicibus, 4 X 6 μ (Fig. 2).

Chemistry: Atranorin and protocetraric acid.

Holotype: Brazil. Serra dos Orgãos National Park, Terezopolis, Rio de Janeiro, W. Watson 521, 5 September 1950 (BM; US, isotype).

Additional specimen examined. Brazil. Lajes, Morro do Pinheiro Seco, Santa Catarina, Reitz & Klein 15719a (US).

This species is closely related to P. brasiliana Nyl., another much more common saxicolous species in southeastern Brazil. It differs chiefly in having atranorin instead of lichexanthone in the cortex.

Parmelia eitenii Hale, sp. nov.

Thallus saxicola, laxe adnatus, rumpens, ca. 6 cm latus, cinereo-albidus, lobis linearibus, elongatis, 2-3 mm latis, dichotome ramosis, isidiis sorediisque destitutis; cortex superior 18-22 μ crassus, stratum gonidiale 20-24 μ crassum, medulla alba, 80-100 μ crassa, cortex inferior 14-16 μ crassus; subtus nigricans, sparse vel modice rhizinosus, rhizinis longis, dichotome ramosis. Apothecia adnata, 3-4 mm diametro, disco imperforato, hymenio 45-50 μ alto, sporis 8; simplicibus, 5 X 7-8 μ (Fig. 3).

Chemistry: Atranorin, lichexanthone, and anziaic acid.

Holotype: Brazil. Serra dos Orgãos National Park, Rio de Janeiro, G. & L. Eiten 7125, 22 April 1966 (US).

This species is also part of the P. brasiliana complex so richly developed in Brazil. It differs principally in the unusual chemical constituents, anziaic acid instead of protocetraric. P. eitenii also seems to be more fragile than P. brasiliana.

Parmelia osorioi Hale, sp. nov.

Thallus saxicola, fragilis, ca. 8 cm diametro, cinereo- vel pallide castaneo-albidus, lobis sublinearibus, 1.5-2 mm latis, crasse isidiatis, isidiis simplicibus vel ramosis, fere pustulatis; cortex superior 14-16 μ crassus, stratum gonidiale 12-14 μ crassum, medulla alba, 65-75 μ crassa, cortex inferior 16-18 μ crassus; subtus niger, modice rhizinosus, rhizinis dichotome ramosis. Apothecia ignota (Fig. 4).

Chemistry: Atranorin and gyrophoric acid.

Holotype: Uruguay. On stones in forest, Abra de Cotto, Lavalleja. H.S. Osorio 6507, 12 October 1969 (MVM; isotype in US).

Additional specimen examined. Uruguay. Santa Teresa, Rocha, Hosseus 48 (H).

P. osorioi has very unusual isidia, simple to nearly coralloid and very large and more or less breaking down apically. It is known only from Uruguay and has no close relatives.

Parmelia protoboliviana Hale, sp. nov.

Thallus corticola, adnatus, fragilis, ca. 8 cm diametro, pallide cinereo-flavicans, lobis sublinearibus, 4-5 mm latis, isidiis sorediisque destitutis; superne planus, nitidus; cortex superior 14-16 μ crassus, stratum gonidiale 16-20 μ crassum, medulla alba, 85-100 μ crassa, cortex inferior 14 μ crassus; subtus niger, dense rhizinosus, rhizinis dichotome ramosis. Apothecia male evoluta, adnata, 1 mm diametro, sporis non evolutis (Fig. 5).

Chemistry: Usnic acid, barbatic acid, obtusatic acid, norobtusatic acid, and 4-O-demethylbarbatic acid.

Holotype: Costa Rica, Volcán Irazú, Cartago, D. Flenniken 1874 (US).

Additional specimen examined. Costa Rica, Same locality as the holotype, Flenniken 2358, 10 July 1969 (US).

All species previously known that contain the barbatic acid complex (cf. C. F. Culberson and M. E. Hale, *Brittonia* 25:162-173. 1973) have colorless atranorin in the cortex. This species produces usnic acid, giving the plants a distinct yellow-green color. Otherwise it is closely related to the broad lobed corticolous population of P. physcioides Nyl. (= P. boliviana Nyl.).

Parmelia singularis Hale, sp. nov.

Thallus corticola, subcoriaceus, ca. 8 cm diametro, cinereo-albus, lobis subirregularibus vel sublinearibus, 3-5 mm latis, margine lobulatis, lobulis usque ad 1 mm longis, angustis; superne planus, nitidus, isidiis sorediisque destitutus; cortex superior 18 μ crassus, stratum gonidiale 12-15 μ crassum, medulla alba, 40-45 μ crassa, cortex inferior 18 μ crassus; subtus niger, dense rhizinosus, rhizinis dense dichotome ramosis. Apothecia numerosa, adnata, ad 5 mm diametro, disco imperforato, hymenio 45-50 μ alto, sporis 8, simplicibus, 6 X 10-12 μ (Fig. 6).

Chemistry: Atranorin and an unidentified fatty acid.

Holotype: Peru. Cerros Calla Calla, 18 km above Leimebamba, Chachapoyas, Amazonas, elev. 3100 m, P.C. Hutchinson and J.K. Wright 5704, 16 June 1964 (US; isotype in UC).

The thallus is rather stiff and coriaceous for so small a species. It is probably not related to the common P. costaricensis Nyl. which also contains fatty acids but is isidiate.

Parmelia steyermarkii Hale, sp. nov.

Thallus corticola, arcte adnatus supra muscos, fragilis, cinereo-albus, 6-8 cm latus, lobis angustis, sublinearibus, 1-1.5 mm latis, isidiatis, isidiis simplicibus, procumbentibus et pro parte dorsiventrals complanatis, ciliatis; cortex superior 11-12 μ crassus, stratum gonidiale 14-16 μ crassum, medulla alba, 55-65 μ crassa, cortex inferior 12-14 μ crassus; subtus niger, modice rhizinosus, rhizinis dichotome ramosis. Apothecia ignota (Fig. 7).

Chemistry: Atranorin, barbatic acid, obtusatic acid, norobtusatic acid (trace), and 4-O-demethylbarbatic acid (trace).

Holotype: Venezuela. Sierra Parima, 45 km NE las Cabeceras del Rio Orinoco, Amazonas, J. Steyermark 106123, 18-23 May 1972 (US).

This is the only isidiate species in the P. physcioides group which has ciliate and consistently dorsiventral isidia at maturity. The other two species, P. dentella Hale & Kurok. and P. imbricatula Zahlbr., are much larger and have normal cylindrical isidia.

Parmelia subphysodolica Hale, sp. nov.

Thallus ramulicola, fragilis, arcte adnatus, 6-7 cm latus, obscure viridi-flavicans, lobis sublinearibus, 1-2 mm latis, superne planus, nitidus, modice isidiatus, isidiis simplicibus, cylindricis, ca. 0.3 mm altis, sparse ciliatis; cortex superior 10-12 μ crassus, stratum gonidiale 14-16 μ crassum, medulla alba, 60-80 μ crassa, cortex inferior 12-14 μ crassus; subtus niger, modice rhizinosus, rhizini dichotome ramosis. Apothecia ignota (Fig. 8).

Chemistry: Atranorin (trace), usnic acid, and physodalic acid.

Holotype: Chile. Puerto Ballena, Chiloe, H.A. Imshaug 43121A, 19 September 1969 (MSC; isotype in US).

Physodalic acid is known in only one other species of the section, P. physodolica Hale, a nonisidiate paramo species in Colombia, which is probably not closely related.

This work was supported by a grant from the Smithsonian Research Foundation. Photography was by the Smithsonian Photographic Laboratory. All chemical determinations were made with thin-layer chromatography in the standard three solvent systems (hexane-ether-formic acid, benzene-dioxane-acetic acid, and toluene-acetic acid).

Explanation of figures (scale in mm): 1. P. boquetensis (holotype, US); 2. P. contradicta (isotype, US); 3. P. eitenii (holotype, US); 4. P. osorioi (isotype, US); 5. P. protoboliviana (holotype, US); 6. P. singularis (holotype, US); 7. P. steyermarkii (holotype, US); 8. P. subphysodolica (holotype, US).



